

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. – 7. (Canceled)

8. (Currently Amended) ~~An image-forming optical system according to claim 25,~~

An image-forming optical system having positive refracting power as a whole for forming an object image, said image-forming optical system comprising:

a first prism member formed from a medium having a refractive index (n) larger than 1 (n>1); and

a second prism member formed from a medium having a refractive index (n) larger than 1 (n>1);

said first prism member comprising:

a first entrance surface through which a light beam from an object enters said first prism member;

a first reflecting surface and a second reflecting surface, which reflect said light beam within said first prism member; and

a first prism exit surface through which said light beam exits said first prism member;

said second prism member comprising:

a second prism entrance surface through which the light beam from said first prism member enters said second prism member;

a third reflecting surface and a fourth reflecting surface; and

a first exit surface through which said light beam exits said second prism member,

wherein said first prism exit surface and said second prism entrance surface are positioned to face each other across an air spacing,

wherein said first prism member forms first intersecting optical paths in which an optical path connecting said second reflecting surface and said first prism exit surface intersects an optical path connecting said first entrance surface and said first reflecting surface,

wherein said second prism member forms second intersecting optical paths in which an optical path connecting said second prism entrance surface and said third reflecting surface intersects an optical path connecting said fourth reflecting surface and said first exit surface,

wherein at least one of said first reflecting surface and said second reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein at least one of said third reflecting surface and said fourth reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein said first prism member and said second prism member are arranged to form an intermediate image plane in an optical path between said second reflecting surface and said third reflecting surface, and

wherein said first entrance surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration.

9. (Currently Amended) ~~An image-forming optical system according to claim 25,~~

An image-forming optical system having positive refracting power as a whole for forming an object image, said image-forming optical system comprising:

a first prism member formed from a medium having a refractive index (n) larger than 1 (n>1); and

a second prism member formed from a medium having a refractive index (n) larger than 1 (n>1);

said first prism member comprising:

a first entrance surface through which a light beam from an object enters said first prism member;

a first reflecting surface and a second reflecting surface, which reflect said light beam within said first prism member; and

a first prism exit surface through which said light beam exits said first prism member;

said second prism member comprising:

a second prism entrance surface through which the light beam from said first prism member enters said second prism member;

a third reflecting surface and a fourth reflecting surface; and

a first exit surface through which said light beam exits said second prism member,

wherein said first prism exit surface and said second prism entrance surface are positioned to face each other across an air spacing,

wherein said first prism member forms first intersecting optical paths in which an optical path connecting said second reflecting surface and said first prism exit surface intersects an optical path connecting said first entrance surface and said first reflecting surface,

wherein said second prism member forms second intersecting optical paths in which an optical path connecting said second prism entrance surface and said third reflecting surface intersects an optical path connecting said fourth reflecting surface and said first exit surface,

wherein at least one of said first reflecting surface and said second reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein at least one of said third reflecting surface and said fourth reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein said first prism member and said second prism member are arranged to form an intermediate image plane in an optical path between said second reflecting surface and said third reflecting surface, and

wherein said first exit surface has a curved surface configuration that gives a power to [[a]] the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration.

10. (Currently Amended) An image-forming optical system according to claim 8 or 9 ~~any one of claims 6 to 9~~, wherein the rotationally asymmetric surface configuration of at least one of said first prism member and said second prism member is a plane-symmetry free-form surface having only one plane of symmetry.

11. (Currently Amended) An image-forming optical system according to claim 10, wherein the one and only plane of symmetry of the plane-symmetry free-form surface of said at least one of said first prism member and said second prism member is coincident with a plane formed by an axial principal ray traveling along said first intersecting optical paths.

12. (Currently Amended) An image-forming optical system according to claim 11, wherein the one and only plane of symmetry of the plane-symmetry free-form surface of said at least one of said first prism member and said second prism member is coincident with a plane formed by an axial principal ray traveling along said second intersecting optical paths.

13. (Canceled)

14. (Currently Amended) ~~An image-forming optical system according to claim 25;~~
An image-forming optical system having positive refracting power as a whole for forming an object image, said image-forming optical system comprising:
a first prism member formed from a medium having a refractive index (n) larger than 1 (n>1); and
a second prism member formed from a medium having a refractive index (n) larger than 1 (n>1);
said first prism member comprising:
a first entrance surface through which a light beam from an object enters said first prism member;
a first reflecting surface and a second reflecting surface, which reflect said light beam within said first prism member; and
a first prism exit surface through which said light beam exits said first prism member;
said second prism member comprising:
a second prism entrance surface through which the light beam from said first prism member enters said second prism member;
a third reflecting surface and a fourth reflecting surface; and
a first exit surface through which said light beam exits said second prism member,
wherein said first prism exit surface and said second prism entrance surface are positioned to face each other across an air spacing,

wherein said first prism member forms first intersecting optical paths in which an optical path connecting said second reflecting surface and said first prism exit surface intersects an optical path connecting said first entrance surface and said first reflecting surface,

wherein said second prism member forms second intersecting optical paths in which an optical path connecting said second prism entrance surface and said third reflecting surface intersects an optical path connecting said fourth reflecting surface and said first exit surface,

wherein at least one of said first reflecting surface and said second reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein at least one of said third reflecting surface and said fourth reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein said first prism member and said second prism member are arranged to form an intermediate image plane in an optical path between said second reflecting surface and said third reflecting surface, and

wherein optical surfaces of said first prism member that are closer to an object side than said intermediate image plane are arranged to correct decentration aberrations as a whole and optical surfaces of said second prism member that are closer to an image-formation plane side than said intermediate image plane are arranged to correct decentration aberrations as a whole so that said intermediate image plane is formed in an approximately planar shape.

15. (Currently Amended) ~~An image-forming optical system according to claim 25,~~

An image-forming optical system having positive refracting power as a whole for forming an object image, said image-forming optical system comprising:

a first prism member formed from a medium having a refractive index (n) larger than 1 (n>1); and

a second prism member formed from a medium having a refractive index (n) larger than 1 (n>1);

said first prism member comprising:

a first entrance surface through which a light beam from an object enters said first prism member;

a first reflecting surface and a second reflecting surface, which reflect said light beam within said first prism member; and

a first prism exit surface through which said light beam exits said first prism member;

said second prism member comprising:

a second prism entrance surface through which the light beam from said first prism member enters said second prism member;

a third reflecting surface and a fourth reflecting surface; and

a first exit surface through which said light beam exits said second prism member,

wherein said first prism exit surface and said second prism entrance surface are positioned to face each other across an air spacing,

wherein said first prism member forms first intersecting optical paths in which an optical path connecting said second reflecting surface and said first prism exit surface intersects an optical path connecting said first entrance surface and said first reflecting surface,

wherein said second prism member forms second intersecting optical paths in which an optical path connecting said second prism entrance surface and said third reflecting surface intersects an optical path connecting said fourth reflecting surface and said first exit surface,

wherein at least one of said first reflecting surface and said second reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein at least one of said third reflecting surface and said fourth reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein said first prism member and said second prism member are arranged to form an intermediate image plane in an optical path between said second reflecting surface and said third reflecting surface, and

wherein, when powers in $[[X- \text{ and } Y-]]$ \underline{X} and \underline{Y} directions of an entire optical system are denoted by P_x and P_y , respectively, and powers in the $[[X-]]$ \underline{X} direction of the first reflecting surface, the second reflecting surface, the third reflecting surface and the fourth reflecting surface are denoted by P_{x1-1} , P_{x1-2} , P_{x2-1} and P_{x2-2} , respectively, and further powers in the $[[Y-]]$ \underline{Y} direction of the first reflecting surface, the second reflecting surface, the third reflecting

surface and the fourth reflecting surface are denoted by Py1-1, Py1-2, Py2-1 and Py2-2, respectively, the following condition is satisfied:

$$0.4 < P_{x1-1}/P_x < 1.1$$

$$0.4 < P_{x1-1}/P_x \leq 0.9 \quad \dots(1).$$

16. (Currently Amended) ~~An image-forming optical system according to claim 25,~~
An image-forming optical system having positive refracting power as a whole for forming an object image, said image-forming optical system comprising:
a first prism member formed from a medium having a refractive index (n) larger than 1 (n>1); and
a second prism member formed from a medium having a refractive index (n) larger than 1 (n>1);
said first prism member comprising:
a first entrance surface through which a light beam from an object enters said first prism member;
a first reflecting surface and a second reflecting surface, which reflect said light beam within said first prism member; and
a first prism exit surface through which said light beam exits said first prism member;
said second prism member comprising:
a second prism entrance surface through which the light beam from said first prism member enters said second prism member;
a third reflecting surface and a fourth reflecting surface; and
a first exit surface through which said light beam exits said second prism member,
wherein said first prism exit surface and said second prism entrance surface are positioned to face each other across an air spacing,
wherein said first prism member forms first intersecting optical paths in which an optical path connecting said second reflecting surface and said first prism exit surface intersects an optical path connecting said first entrance surface and said first reflecting surface,
wherein said second prism member forms second intersecting optical paths in which an optical path connecting said second prism entrance surface and said third reflecting surface intersects an optical path connecting said fourth reflecting surface and said first exit surface,

wherein at least one of said first reflecting surface and said second reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein at least one of said third reflecting surface and said fourth reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein said first prism member and said second prism member are arranged to form an intermediate image plane in an optical path between said second reflecting surface and said third reflecting surface, and

wherein, when powers in $[[X\text{- and } Y\text{-}]]$ X and Y directions of an entire optical system are denoted by P_x and P_y , respectively, and powers in the $[[X\text{-}]]$ X direction of the first reflecting surface, the second reflecting surface, the third reflecting surface and the fourth reflecting surface are denoted by P_{x1-1} , P_{x1-2} , P_{x2-1} and P_{x2-2} , respectively, and further powers in the $[[Y\text{-}]]$ Y direction of the first reflecting surface, the second reflecting surface, the third reflecting surface and the fourth reflecting surface are denoted by P_{y1-1} , P_{y1-2} , P_{y2-1} and P_{y2-2} , respectively, the following condition is satisfied:

$$0.1 < P_{x1-2}/P_x < 0.6 \quad \dots(2).$$

17. (Currently Amended) ~~An image-forming optical system according to claim 25,~~
An image-forming optical system having positive refracting power as a whole for forming an object image, said image-forming optical system comprising:

a first prism member formed from a medium having a refractive index (n) larger than 1 (n>1); and

a second prism member formed from a medium having a refractive index (n) larger than 1 (n>1);

said first prism member comprising:

a first entrance surface through which a light beam from an object enters said first prism member;

a first reflecting surface and a second reflecting surface, which reflect said light beam within said first prism member; and

a first prism exit surface through which said light beam exits said first prism member;

said second prism member comprising:

a second prism entrance surface through which the light beam from said first prism member enters said second prism member;

a third reflecting surface and a fourth reflecting surface; and

a first exit surface through which said light beam exits said second prism member,

wherein said first prism exit surface and said second prism entrance surface are positioned to face each other across an air spacing,

wherein said first prism member forms first intersecting optical paths in which an optical path connecting said second reflecting surface and said first prism exit surface intersects an optical path connecting said first entrance surface and said first reflecting surface,

wherein said second prism member forms second intersecting optical paths in which an optical path connecting said second prism entrance surface and said third reflecting surface intersects an optical path connecting said fourth reflecting surface and said first exit surface,

wherein at least one of said first reflecting surface and said second reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein at least one of said third reflecting surface and said fourth reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein said first prism member and said second prism member are arranged to form an intermediate image plane in an optical path between said second reflecting surface and said third reflecting surface, and

wherein, when powers in $[[X- \text{ and } Y-]]$ X and Y directions of an entire optical system are denoted by P_x and P_y , respectively, and powers in the $[[X-]]$ X direction of the first reflecting surface, the second reflecting surface, the third reflecting surface and the fourth reflecting surface are denoted by P_{x1-1} , P_{x1-2} , P_{x2-1} and P_{x2-2} , respectively, and further powers in the $[[Y-]]$ Y direction of the first reflecting surface, the second reflecting surface, the third reflecting surface and the fourth reflecting surface are denoted by P_{y1-1} , P_{y1-2} , P_{y2-1} and P_{y2-2} , respectively, the following condition is satisfied:

$$0.2 < P_{x2-1}/P_x < 1$$

$$0.37 \leq P_{x2-1}/P_x < 1 \quad \dots(3).$$

18. (Currently Amended) ~~An image-forming optical system according to claim 25;~~
An image-forming optical system having positive refracting power as a whole for forming an object image, said image-forming optical system comprising:
a first prism member formed from a medium having a refractive index (n) larger than 1 (n>1); and
a second prism member formed from a medium having a refractive index (n) larger than 1 (n>1);
said first prism member comprising:
a first entrance surface through which a light beam from an object enters said first prism member;
a first reflecting surface and a second reflecting surface, which reflect said light beam within said first prism member; and
a first prism exit surface through which said light beam exits said first prism member;
said second prism member comprising:
a second prism entrance surface through which the light beam from said first prism member enters said second prism member;
a third reflecting surface and a fourth reflecting surface; and
a first exit surface through which said light beam exits said second prism member,
wherein said first prism exit surface and said second prism entrance surface are positioned to face each other across an air spacing,
wherein said first prism member forms first intersecting optical paths in which an optical path connecting said second reflecting surface and said first prism exit surface intersects an optical path connecting said first entrance surface and said first reflecting surface,
wherein said second prism member forms second intersecting optical paths in which an optical path connecting said second prism entrance surface and said third reflecting surface intersects an optical path connecting said fourth reflecting surface and said first exit surface,
wherein at least one of said first reflecting surface and said second reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface

configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein at least one of said third reflecting surface and said fourth reflecting surface has a curved surface configuration that gives a power to the light beam, said curved surface configuration being a rotationally asymmetric surface configuration that corrects aberrations due to decentration,

wherein said first prism member and said second prism member are arranged to form an intermediate image plane in an optical path between said second reflecting surface and said third reflecting surface, and

wherein, when powers in [[X- and Y-]] X and Y directions of an entire optical system are denoted by P_x and P_y , respectively, and powers in the [[X-]] X direction of the first reflecting surface, the second reflecting surface, the third reflecting surface and the fourth reflecting surface are denoted by P_{x1-1} , P_{x1-2} , P_{x2-1} and P_{x2-2} , respectively, and further powers in the [[Y-]] Y direction of the first reflecting surface, the second reflecting surface, the third reflecting surface and the fourth reflecting surface are denoted by P_{y1-1} , P_{y1-2} , P_{y2-1} and P_{y2-2} , respectively, the following condition is satisfied:

$$0.5 < P_{x2-1}/P_{y2-1} < 2.0 \quad \dots(4).$$

19. (Withdrawn) A finder optical system comprising:

said image-forming optical system according to claim 25, said image-forming optical system being provided as a finder objective optical system;

an image-erecting optical system for erecting an object image formed by said finder objective optical system; and

an ocular optical system.

20. (Withdrawn) A camera apparatus comprising:

said finder optical system according to claim 19; and

an objective optical system for photography provided in parallel to said finder optical system.

21. (Withdrawn) An image pickup optical system comprising:

said image-forming optical system according to claim 25; and

an image pickup device placed in an image plane formed by said image-forming optical system.

22. (Withdrawn) A camera apparatus comprising:
said image-forming optical system according to claim 25, said image-forming optical system being provided as an objective optical system for photography; and
a finder optical system placed in one of an optical path separate from an optical path of said objective optical system for photography and an optical path split from the optical path of said objective optical system for photography.
23. (Withdrawn) An electronic camera apparatus comprising:
said image-forming optical system according to claim 25;
an image pickup device placed in an image plane formed by said image-forming optical system;
a recording medium for recording image information received by said image pickup device; and
an image display device that receives image information from one of said recording medium and said image pickup device to form an image for observation.
24. (Withdrawn) An endoscope system comprising:
an observation system having said image-forming optical system according to claim 25 and an image transmitting member for transmitting an image formed by said image-forming optical system along a longitudinal axis; and
an illumination system having an illuminating light source and an illuminating light transmitting member for transmitting illuminating light from said illuminating light source along said longitudinal axis.
25. (Canceled)